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HEATER FOR ATTENUATED TOTAL REFLECTANCE SILVER CHLORIDE PRISM

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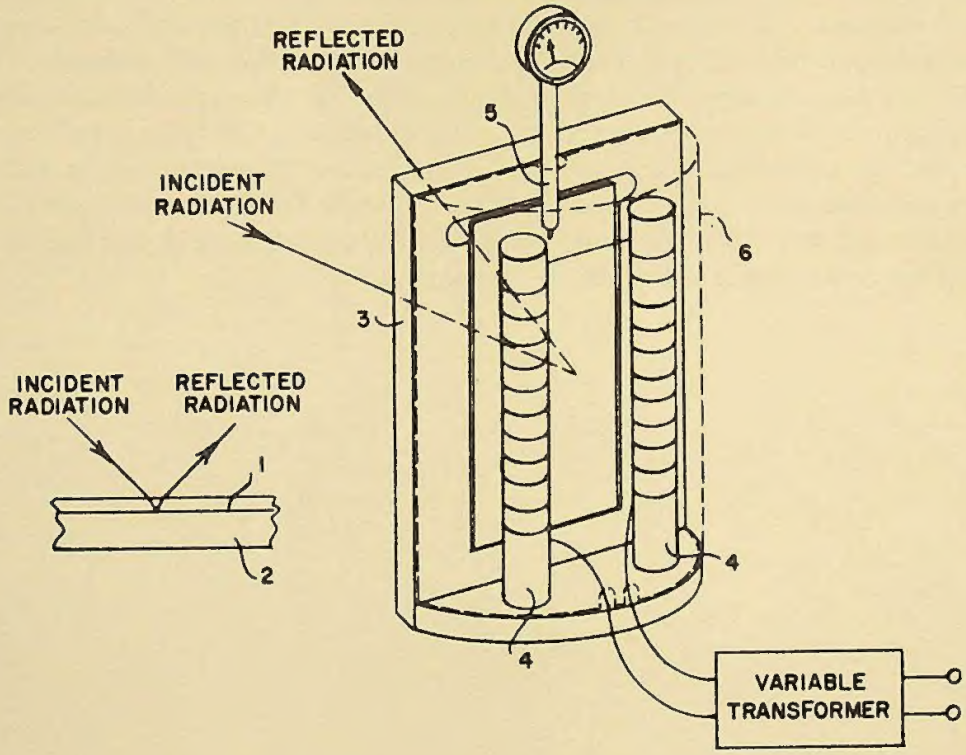

To determine the best cure cycle for a thermosetting resin in order to achieve the desired physical characteristics of the resin, transmission infrared spectrometry can be used if the resin is transparent. However, if the thermosetting resin contains an opaque filler, e.g., $CaCO_3$, the best cure cycle can no longer be determined by such methods.

Instead, it is necessary to resort to attenuated total reflectance infrared spectroscopy in conjunction with a prism heater as shown. This prism heater comprises disposable silver chloride prism plate 1 onto which is coated the opaque thermosetting resin 2 to be evaluated. Plate 1 is held into position by prism plate holder 3 having heater rods 4. The latter are positioned such that resin 2 can be heated during

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infrared radiation. Rods 4 are connected to a variable transformer so that the temperature can be varied. To monitor the temperature during heating, thermocouple 5, connected to a temperature gauge, is attached to holder 3, so as to contact the thermosetting coating of plate 1. Cover 6, shown by the dashed lines, surrounds rods 4 to prevent dissipation of heat.

In operation, incident infrared radiation passes through plate 1 and is reflected off resin 2 and back to an infrared spectrophotometer. The absorption or reflection of the incident infrared radiation by the resin 2 coating changes during curing. Hence, absorption maxima at wavelengths which are not initially reflected at a low intensity are subsequently reflected during the curing cycle. A decrease in intensity or disappearance of absorption maxima at other wavelengths also occurs during the curing cycle. With this data, the best curing cycle of the thermosetting resin can be determined.